

EXHIBIT “I”

(part 1)

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

**AGERE SYSTEMS, INC., CYTEC
INDUSTRIES INC., FORD MOTOR
COMPANY, SPS TECHNOLOGIES,
LLC and TI AUTOMOTIVE SYSTEMS
LLC,**

Plaintiff,

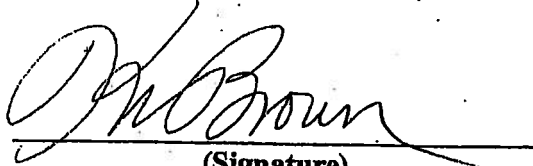
v.

**ADVANCED ENVIRONMENTAL
TECHNOLOGY CORPORATION, et al.,**

Defendants.

**Civil Action No.
02-cv-3830 (LDD)**

**Expert Witness Report of
Kirk W. Brown, Ph.D,**

A handwritten signature in cursive script, appearing to read 'Kirk W. Brown', is written over a horizontal line.

(Signature)

September 29, 2006

I. Expert Qualifications

1. I am a Principal Consultant with the firm of SI Group, LP ("SIG"). SIG's offices are located at 1701 Southwest Parkway, Suite 100, College Station, Texas.

2. My educational background includes a Bachelor of Science degree in Agronomy from Delaware Valley College (1962), a Masters of Science degree in Agronomy/Plant Physiology from Cornell University (1964), and a Doctor of Philosophy degree in Agronomy from the University of Nebraska (1969).

3. From 1970 through 2001, I was a member of the faculty at Texas A&M University and currently serve as *Professor Emeritus* in the Soil and Crop Sciences Department, Texas A&M University, College Station, Texas.

4. During my tenure at Texas A&M, I conducted extensive research including numerous research projects for the U.S. Environmental Protection Agency ("USEPA") on the fate and transport of contaminants in the environment including Resource Conservation and Recovery Act ("RCRA") hazardous wastes and Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") hazardous substances. As a result of my research efforts, I have authored or co-authored over 190 peer-reviewed, scientific publications.

Research projects, which I conducted included investigations of the movement of hazardous substances through geomembrane landfill liners and caps and the underlying soil, the fate and movement of hazardous metals in the environment and the land treatment of wastes. My research was instrumental in development of the USEPA regulations which specify the design of hazardous and municipal waste landfills, and in the banning of liquid and untreated wastes from disposal in landfills.

5. I have served on technical advisory panels to the USEPA, US Congressional

Office of Technology Assessment, National Science Foundation, and the National Academy of Science. Significant reports resulting from these committee assignments include, Groundwater and Soil Cleanup, Improving Management of Persistent Contaminants (1999); Ranking Hazardous Waste Sites (1994); Coming Clean, Superfund Problems Can be Solved (1989); and Superfund Strategy (1985).

6. I was the primary author of two publications for the USEPA entitled Hazardous Waste Land Treatment (1983) and Characteristics of Hazardous Waste Streams (1982). Both of these texts deal with the composition, handling, and disposal of hazardous substances in industrial waste streams.

7. I was formerly a member of the American Society of Agronomy (1970-2001), Soil Science Society of America (1970-2001), American Chemical Society (1970-2001), and the International Society of Soil Science (1970-2001). Additionally, I served on the editorial board for Environmental Engineering Science, formerly known as Hazardous Waste and Hazardous Materials from 1989 through 2001.

8. Some of my other committee assignments include the following:

- National Academy of Sciences, National Research Council Committee on Environmental Technologies Subcommittee on Landfills (1995-1998).
- USEPA Review for Risk Assessment for Petroleum Industry Hazardous Waste Listing Determination (Sept 1995).
- Environmental Geosciences Advisory Committee of the American Geological Institute representing the Soil Science Society of America (1993-2000).
- National Academy of Sciences (NRC) Committee on Remedial Action Priorities for Hazardous Waste Sites (1991-1994).

- USEPA Hazardous Waste Center Review Panel (1988).
- National Science Foundation, Environmental Engineering Div., Review Panel (1987-1995).
- Advisory Panel to U.S. Congressional Office of Technology Assessment (OTA) on An Assessment of the Effectiveness of the USEPA in Identifying, Prioritizing and Cleaning Up Hazardous Waste Sites (1987-1995).
- Organizing Committee for SSSA Workshop on Utilization, Treatment and Disposal of Waste on Land (1985).
- Panel to Write Research Needs for Hazardous Wastes Treatment and Disposal for National Science Foundation. Drexel University, PA (1986).
- USEPA Technical Advisory Panel on the Adequacy of Ground Water Monitoring at Hazardous Waste Landfills (1985).
- USEPA Panel to Review the Acceptability of Landfill Disposal of Sewage Sludge (1984).
- Office of Water Regulations and Standards Committee on Municipal Sludge Landfilling to Advise USEPA on the Pollutants which should be Regulated for Various Disposal Options and the Methods or Procedures to be Used for Regulating such Pollutants (1984).
- Advisory Panel to U.S. Congressional Office of Technology Assessment (OTA) to Determine the Effectiveness of Current Programs to Clean Up Uncontrolled Hazardous Waste Sites (1983-84).
- USEPA Science Review Panel for Environmental Engineering Research Grants (1982-1998).

- United States Environmental Protection Agency Land Treatment Task Force (1981-1985).

9. I have been a consultant in the field of environmental science and engineering for the past 25 years. I founded K. W. Brown and Associates, Inc., and served as President from 1980 until 1991. I was employed as a Principal Consultant with K. W. Brown Environmental Services from 1991 until 1999 and with SIG since 2000. Consulting activities have included consultations on the cleanup and disposal of wastes, the impacts of hazardous waste on the environment, the design of hazardous waste landfills and solid waste management units, and the fate and mobility of hazardous substances in the soil, groundwater, and air.

10. As part of my work for the USEPA in the late 1970's and early 1980's, I conducted an extensive survey of industrial and manufacturing facilities. Having reviewed and studied the industrial processes, the waste streams generated, and the disposal practices by these facilities, I have expertise in the characteristics of the industrial waste streams generated by parties involved in this matter. I also have experience in the remedial design for hazardous waste disposal sites, remediation/reclamation of waste contaminated soil and groundwater, and the design of hazardous waste landfills and solid waste management units.

11. I have qualified and given testimony as an expert witness in civil cases in federal and state courts, regulatory hearings, and enforcement actions pertaining to hazardous wastes, heavy metal contamination, the fate and transport of inorganic chemicals and other contaminants in environmental media, and remediation of contaminated sites, among other issues. I have offered opinions related to the fate and transport and/or clean up of organic chemical and metals at several Superfund sites.

12. In the published opinion in the matter entitled *B.F. Goodrich v. Bertowski*, 99 F.3d 505, 525 (2d Cir. 1996), the Second Circuit commented on my qualifications in the field of environmental remediation as follows: "... it is difficult for us to imagine an expert with more experience and knowledge in the hazardous substances field than Dr. Brown."

13. In the published opinion in the matter entitled *Interfaith Community Organization v. Honeywell International, Inc.*, 263 F. Supp. 2d 796, 810 (D.N.J. 2003), *aff'd* 399 F.3d 248 (3d Cir. 2005), the district court commented on my qualifications and trial testimony as follows:

I found Dr. Brown to be most believable and credible and I therefore afforded his testimony the greatest weight. Not only was he a knowledgeable and believable witness, but the subject of his testimony was perhaps the most significant in assisting the Court regarding the appropriate remediation at the Site. Dr. Brown was an excellent witness.

II. Curriculum Vitae, Previous Expert Testimony and Publications

14. A copy of my current curriculum vitae, a list of cases in which I have given expert testimony and a list of the publications authored/co-authored by me, are annexed hereto as Exhibits A, B and C, respectively.

III. Engagement Compensation

15. I am being compensated for my work in this case at an hourly rate of \$200 per hour for non-testimony time and \$250 per hour for testimony time. SI Group, LP has been retained to work under my direction and assist me in gathering information for the preparation of this report. The rate of compensation for members of SIG ranges from \$73 to \$120 per hour.

IV. Scope of Assignment

16. I have been retained by counsel for Handy & Harman Tube Company, Inc. ("Handy & Harman") to review information and data relating to (1) waste generation at Handy & Harman's Norristown, Pennsylvania facility (the "Handy & Harman Facility") and (2) the

Boarhead Farm Superfund Site (the "Site") and to provide my professional opinions based on certain assumptions (described below) with respect to the following:

- the impact, if any, that certain wastes generated at the Handy & Harman Facility, and alleged to have been transported to and disposed of at the Site during the period from 1969 to 1977, had, have, or will have on the remediation of the Site.

V. Data and Other Information Considered

17. I have reviewed documents provided by counsel and gathered independently from reputable sources. Specific documents, data, and/or other information that I have considered in forming my opinions in this case are listed in Exhibit D hereto. My opinions are also based on my education and experience as described herein, relevant scientific journal articles or textbooks, and/or observations made during my visit to the Site. Additionally, as discovery is ongoing in this case, I reserve the right to base my opinions on additional documents or information that may be produced by any party and/or their consultants following the submittal of this report.

VI. Familiarity with the Site

18. I conducted a visit of the Site on September 18, 2006. During this visit, I observed, among other things, the locations associated with the burial of intact drums and the locations of the soil and groundwater "hot spots".

VII. Purpose of Report

19. This report and the opinions set forth herein, as well as any testimony I may give in depositions in this matter or at the time of trial, is designed to assist the court in making determinations under 42 U.S.C. § 9613(f) as part of the allocation portion of the proceedings in this case.

VIII. Assumptions

20. The opinions set forth in this Report are based upon the following assumptions:

a. Plaintiffs can establish under the applicable legal standards Handy & Harman's nexus to the Boarhead Farms Superfund Site;

b. The DeRewal Chemical Company invoice dated February 1973 is found to be an admissible piece of evidence under the applicable legal standards; and

c. The facts relating to Handy & Harman testified to by Manfred DeRewal, Sr., Manfred DeRewal, Jr., Bruce DeRewal, and John Barsum in their respective depositions in this litigation are presented at trial and are found to be admissible and credible.

21. Nothing in this report or in any of my opinions is, or should be construed as, an admission by Handy & Harman of any of the assumptions set forth above.

IX. Expert Opinions

22. This section of my report will present my professional opinions and the basis of those opinions. As noted above, each of my opinions is based upon the Assumptions set forth in Paragraph 20 above.

A. Opinions

23. It is my professional opinion that the chemical fingerprint of the wastes contained in the drums that were removed from the Site includes chemical compounds and metals that were not used at the Handy & Harman Facility and therefore, the drummed wastes buried at the Site could not be attributed to the Handy & Harman Facility.

24. It is my professional opinion that the contaminated soils and groundwater associated with the "hot spots" at the Site containing benzene and PCE with a mixture of other

chlorinated volatile organic compounds were not caused by waste generated by the Handy & Harman Facility.

25. If the Handy & Harman Facility had disposed of wastes, such as metals, spent solvents, and spent acids at the Site, these wastes would be indistinguishable from the waste contributed by other parties. Further, if Handy & Harman's waste had been disposed of at the Site, waste attributed solely to the Handy & Harman Facility would not be distinguishable from the wastes identified in the soils and shallow groundwater at the Site.

26. In my professional opinion, the contribution from the Handy & Harman Facility, if any, to the contamination due to bulk waste disposal at the Site would be at most, de minimis (USEPA, 1995d; USEPA, 1993b).

27. In my professional opinion, the contribution from the Handy & Harman Facility, if any, to the contamination due to the drummed waste disposal at the Site would be at most, de minimis (USEPA, 1995d; USEPA, 1993b).

28. In my professional opinion, the contribution from the Handy & Harman Facility, if any, to the contamination due to the total volume of waste disposed of at the Site would be at most, de minimis (USEPA, 1995d; USEPA, 1993b).

29. My opinions as set forth above are within a reasonable degree of scientific certainty.

B. Basis of Opinion

i. Handy & Harman Facility

30. During the period of interest, the Handy & Harman Facility manufactured small diameter, hollow tubing from stainless steel, carbon steel, and nickel-iron alloys. For this manufacturing process, raw stock materials were precision drawn through tubing dies and

annealed in an on-site furnace (Handy & Harman, 2004a). The intermediate products were cleaned in a degreasing vat to remove any oil or impurities and dried prior to annealing (Handy & Harman, 2004a). The finished tubing products were acid treated in a pickling bath, polished, and cut to finish specifications (Handy & Harman, 2004a).

31. As a result of the manufacturing process, the following waste streams were produced at the Handy & Harman Facility:

- a. Waste raw materials, including Nickel-based Inconel steel (Curran, 2004, pg. 12), 300 and 400 series stainless steel (Curran, 2004, pg. 12-13), 1010 carbon-iron steel (Curran, 2004, pg. 13), nickel-iron alloy composed of approximately 50% nickel and 50% iron (Curran, 2004, pg. 39), and welding metals used for the manufacture of hypodermic needles (Curran, 2004, pg. 38);
- b. Polisher wastes composed of water, grit, and metals from the stainless steel products (Curran, 2004, pg. 71);
- c. Spent Acids, including waste mixtures of water with sulfuric, nitric, hydrochloric, and hydrofluoric acids (Curran, 2004, pg. 21; Curran, 2004, pg. 31);
- d. Bottom sludges from the degreaser (Curran, 2004, pg. 56-57);
- e. Spent cleaning solvents consisting of acetone and methyl ethyl ketone (Curran, 2004, pg. 48-49; Curran, 2004, pg. 51-52);
- f. Used oil and lubricants (Curran, 2004, pg. 73);

- g. An industrial waste solution containing wash water, oil and grease, dirt, grime, etc. generated during the plant shut-down cleaning operations (Curran, 2004, pg. 54-55); and
- h. Office wastes/plant trash (Handy & Harman, 2004a).

32. By virtue of the processes conducted at the Handy & Harman Facility, Handy & Harman did not use the following chemical compounds:

- a. Benzene;
- b. Perchloroethylene ("PCE");
- c. Carbon tetrachloride ("CCl₄");
- d. Cyanide ("CN");
- e. Dinitrotoluene ("DNT");
- f. Nitrobenzene ("NB"); and
- g. Cadmium¹.

These chemical constituents would not have been present in any of the waste streams generated at the Handy & Harman Facility.

33. The following metals were not associated with the manufacturing processes at the Handy & Harman Facility and therefore, would only have been found in miniscule quantities, if any, in the waste streams generated at the Handy & Harman Facility:

- a. Arsenic;
- b. Selenium;
- c. Silver;

1. In alloys of stainless steel, carbon steel and nickel-iron, cadmium serves as a sacrificial anode and enhances corrosion of the metal. For this reason, cadmium is excluded as a component of stainless steel and would not be present as a component of the waste from the Handy & Harman Facility (Sedriks, 1996; Dillon, 1995).

d. Lead; and

e. Mercury.

34. The Handy & Harman Facility did not use paints or adhesives in the manufacture of tubing and would not have generated paint wastes, spent resins, or waste polymers which were the wastes found in the drums discovered and removed during the response actions performed for the remediation of Operable Unit OU-2 (Brown and Caldwell, 2004c).

ii. *Bulk Waste*

35. Based upon the data and information which I have reviewed, spent acid was the only waste stream that was generated at the Handy & Harman Facility and ultimately removed, transported and disposed of as bulk waste. The only suggestion in the data and information, which I have reviewed that the spent acid bulk waste generated at the Handy & Harman Facility was transported to and disposed of at the Site was the deposition testimony of Manfred DeRewal, Jr. ("Freddy DeRewal"). During his deposition, Freddy DeRewal stated that he picked up bulk waste (without specifying the type of waste) on one occasion from a facility outside of Norristown that he believed was the Handy & Harman Facility (DeRewal, F., 2003a, pg. 119). The former and current employees of the Handy & Harman Facility who gave deposition testimony uniformly testified that (1) the bulk waste at the Handy & Harman Facility was spent acid; (2) the spent acid bulk waste was hauled from the Handy & Harman Facility by Waste Conversion Systems as early as 1965-1970 (Curran, 2004, pg. 16-17); and (3) Waste Conversion Systems had a number of successors, each of whom continued to haul spent acid bulk waste from the Handy & Harman Facility continuously from the 1970s through the present (Handy & Harman, 2004a).

36. In all of the information that I have reviewed, there is no evidence of any trip tickets or invoices related to the transport and disposal of bulk waste liquids from the Handy & Harman Facility by DeRewal Chemical Company.

37. In the unlikely event that Freddy DeRewal picked up and disposed of one load of bulk waste liquids, the quantity of liquids that could have been disposed from the Handy & Harman Facility was insignificant when compared to the total volume of bulk liquids disposed of at the Site. According to the deposition testimony of Freddy DeRewal (DeRewal, F., 2003a, p. 33-34),

"In the very beginning we weren't actually that into it big in the waste hauling business. I mean, we did some runs, it didn't actually start -- like I'm saying, when we started really getting into it we were doing like maybe 30 loads of bulk a week, bulk tankers. And in the beginning we might have been doing anywhere from five to eight to ten, ten loads."

38. At a rate of 8 to 10 loads per week for a period of one and one half years (1973-1974) and a rate of 30 loads per week during the last two years of operations (1975-1977), the approximate total quantity of waste as Freddy DeRewal described would be 3,600 tanker loads. Had one load of bulk liquids from Handy and Harman been disposed at the site, one load of bulk liquids out of approximately 3600 loads is an insignificant, de minimis volume of waste that could have been disposed of at the Site.

39. Further, spent acids did not drive the remedy at the Site (USEPA, 1998).

iii. *Drummed Waste*

40. In the information and data that I have reviewed, the only suggestion that drummed waste generated at the Handy & Harman Facility was transported by DeRewal Chemical Company was contained in a single invoice dated February 1973 (Curran, 2004, Deposition Exhibit 3) and certain statements by Bruce DeRewal (DeRewal, B., 2003).

41. The invoice from DeRewal Chemical Company to Handy & Harman dated February 1973 does not provide evidence of disposal of hazardous waste at the Site. This invoice indicates the delivery of empty drums to the Handy & Harman Facility and the transport of drums containing "Industrial Waste Solution". The invoice does not specify a "shipped to" location nor does it in any way indicate the location for ultimate disposal of the industrial waste solution (Curran, 2004, Deposition Exhibit 3).

42. "Industrial Waste Solution" was described in the deposition testimony of Thomas Curran (2003, p. 55) as "That sort of combination most of it was water, it also has like some just sludge from around the machines in it and that was all taken off." Additional information provided by current Handy & Harman employees knowledgeable of the cleaning process during plant shut-down indicated that the industrial waste solution consisted of wash water that was used to remove residual grease and oil from the drawing machines (Coates, 2006).

43. Based on the description of the cleaning process during the plant shut-down, the wastewater generated as the industrial waste solution was non-hazardous.

44. Based on my experience with and knowledge of waste disposal methods utilized during the relevant period (1969-1977), when non-hazardous wastewater was placed in drums for disposal, the standard practice for disposal companies was to empty the drums into a public sewer system or publicly owned treatment works and recycle the metal drums for reuse. The disposal of waste liquids into the Philadelphia storm sewer system was clearly used by DeRewal Chemical Company in their operation of the Ontario Street and Wissinoming facilities (DeRewal, B., 2003, pg. 47).

45. In his deposition testimony, Bruce DeRewal testified that he hauled drummed wastes from an undisclosed facility in the Norristown area on an unspecified number of

occasions. The drummed wastes were hauled to both the Ontario Street facility and the Site with an estimated 25% or less of the drums taken to the Site. For the drums hauled to the Site, Mr. DeRewal did not provide any information regarding the disposal of the drums.

46. During his testimony, Bruce DeRewal did not specifically recall picking up wastes from the Handy & Harman Facility (DeRewal, B., 2003, pg. 42),

- Q. Okay, fair enough. Did you ever pick up any waste from a company called Handy & Harman?
- A. Not that I recollect, no.
- Q. Do you remember picking up any waste from a company outside of Norristown or in the Norristown area?
- A. Yeah, but I believe that was Standard Pressed Steel, wasn't it?

47. Further in his deposition, Bruce DeRewal testified that he picked up wastes from a facility outside of Norristown, but was unable to recall how many times he might have gone to the facility (DeRewal, B., 2003, pg. 50).

- Q. The Norristown, the outside Norristown place that we talked about a few minutes ago, I don't remember if I asked you how many times you went there.
- A. I don't recall. Not that many.
- Q. By "not that many", we mean less than ten?
- A. Yes.
- Q. Less than five?
- A. Let's say less than ten, let's keep it at ten.
- R. You're comfortable with less than ten?
- A. Yeah, I think.

48. In his deposition, Bruce DeRewal stated that he picked up approximately 20 drums of wastes in a box truck each time he visited the facility outside of Norristown, but he was unable to recall the number of drums that would have been hauled to the Site and he provided no information regarding the disposal of drums at the Site (DeRewal, B., 2003, pg 55-57).

- Q. How many drums do you think you put in the box truck?
- A. About 20.
- Q. On the times that you went to that facility and picked up drums, where did those drums go for disposal?

- A. They went down to, they would go down to Ontario Street or I would take them back to the farm.
- Q. Okay. Any other choices between Ontario Street and the farm?
- A. No, those were the only two places.
- Q. On the occasions that you went to that facility that we're talking about to pick up drums, how many times did you take them back to the farm?
- A. I don't recall.
- Q. Sitting here today, is it, can you come up with a reasonable approximation of whether it was half the time or a quarter of the time?
- A. Maybe a quarter or less. Most of the time it was in Philly.
- Q. Okay. Quarter or less went back to the Boarhead site --
- A. Yes.
- Q. -- to be disposed of?
- A. I don't know. I took the truck back and dropped it.
- Q. You took the truck back and dropped it and it had the drums in it?
- A. Yes.
- Q. You never saw the drums leave any other way?
- A. No.

49. Further, when asked in his deposition, Bruce DeRewal stated that he did not know what type of waste was contained in the drums he removed from the facility outside of Norristown (B. DeRewal, 2003, pg. 135).

- Q. Did you know what type of waste was contained in the drummed waste that you picked up from the facility located outside of Norristown?
- MR. HARRIS: Objection.
- THE WITNESS: No.

50. Taking Mr. DeRewal's testimony as an accurate representation of the waste hauling and disposal operations that could have transpired, the maximum number of drums that possibly could have been transported from the Handy & Harman Facility (assuming that the facility "outside of Norristown" was the Handy & Harman Facility), and brought to the Site would have been 50 drums².

2. Again, there is no documentary or testimonial evidence that I have seen which would indicate that drums from the Handy & Harman Facility were disposed of at the Site.

51. Based on the Federal On-Scene Coordinator's Report (USEPA, 1993a) and the Remedial Construction Report OU-2 (Brown and Caldwell, 2004c), over 2500 drums were removed from the Site. In the unlikely event that 50 drums from the Handy & Harman Facility could have been disposed of at the Site, the maximum volumetric contribution of drummed wastes from Handy & Harman would be less than 2 %, if any.

iv. Composition of Wastes

52. In the deposition of Thomas Curran (2004), Mr. Curran described the waste streams at the Handy & Harman Facility that were placed in drums for disposal. These wastes included:

- a. Polisher wastes;
- b. Bottom sludges from the degreaser;
- c. Spent acetone and methyl ethyl ketone cleaning solvents;
- d. Used machine oils; and
- e. Industrial waste solution.

53. The polisher wastes as described by Mr. Curran would have contained water with small amounts of grit and metal particulates of stainless steel and the other raw materials used at the Handy & Harman Facility (Curran, 2004, pg. 71-72). The polisher wastes were generated in small quantities and were combined with the waste stored in a drum at the individual machine (Curran, 2004, pg. 73). The drums of polisher wastes were removed from the Handy & Harman Facility by Delaware Trucking (Curran, 2004, pg. 74-76). Delaware Trucking has no relationship with the Site.

54. Handy & Harman used a degreaser at the Handy & Harman Facility. Trichloroethylene ("TCE") was used in the degreaser to clean the tubing during the

manufacturing process (Handy & Harman, 2004a). The Handy & Harman Facility did not use benzene or PCE.

55. The bottom sludges from the degreaser were described by Mr. Curran as solid material which had to be removed from the bottom of the degreaser by shovel (Curran, 2004, pg. 56). Mr. Curran indicated that the removal of sludge from the degreaser was an infrequent process that generated only a small volume of waste (Curran, 2004, pg. 51-52).

Q. Can you estimate whether it was more than 20 or less than 20? 25 drums?

MR. AGNELLO: Again don't guess.

THE WITNESS: I can't because I can remember witnessing soon after we had it dried out and one, during one of our periods and I was astounded at how little was in the bottom. In fact, I was quite annoyed that we were doing it when I saw what happened. So I can only assume that they were guessing at when it needed to be done. It was not frequent, though, what I would call frequent.

Mr. Curran further stated that Chemcene was used by Handy & Harman for the transport and reprocessing of the degreaser sludges as early as he could recall (Curran, 2004, pg. 58).

56. If drums containing the degreaser sludges from the Handy & Harman Facility had been disposed of at the Site, the wastes would have been solids with minimal free liquid TCE. The TCE incorporated in the degreaser sludges was strongly partitioned into the sludge and not present as a free-flowing liquid. The minimal volume of free liquid TCE in the drums containing the degreaser sludge would not have driven the remedy for the Site.

57. In his deposition, Mr. Curran (Curran, 2004, pg. 48-49) described the use of acetone and methyl ethyl ketone as cleaning solvents for tools. These cleaning solvents were used in small quantities and any spent solvent "would have been drummed, if they had not evaporated" (Curran, 2004, pg. 49). The volume of waste generated from these cleaning

operations would have been minimal due to the limited volume of solvents used and the loss due to evaporation.

58. Oils such as 10W-30 and 5W-30 were used as lubricants and coolants for some of the machines and furnaces at the Handy & Harman Facility (Curran, 2004, pg. 73). Mr. Curran indicated that these oils were changed on routine maintenance intervals with the spent oil collected in 55 gallon drums and sold for recycling (Curran, 2004, pg 73). Additional evidence provided by Handy & Harman indicated that waste lubricants were removed from the facility by Lightman Drum, Chemcene, and Delaware Container (Handy & Harman, 2004a).

59. As previously discussed, the industrial waste solution would have consisted of wash water with trace amounts of residual grease and oil removed from the drawing machines (Curran, 2004, p. 55). The waste generated as the industrial waste solution was non-hazardous and would have contained only miniscule quantities, if any, of any hazardous substances (i.e., those that may have been contained in the raw materials and/or picked up with the grease and lubricants used with the drawing machines).

60. Based on my review of information and data listed in Exhibit D, the only waste stream at the Handy & Harman Facility that would have been produced in sufficient quantities to make up a load of 20 drums was the industrial waste solution, which would have been classified as non-hazardous wastewater.

61. The Federal On-Scene Coordinator's Report (USEPA, 1993a) provided a chemical profile of the wastes contained in the drums removed from the Site. As shown in Table 1, the analysis of each group of drums indicated the presence of one or more hazardous substances in the waste that were not constituents of the wastes generated by the Handy & Harman Facility. Further, the physical state of the waste (i.e., solid or liquid) reported for the

drums removed from the Site did not match the physical characteristics of the degreaser sludge generated at the Handy & Harman Facility. In all cases, the characteristic profile for each group of drums removed did not match the chemical composition of the waste streams from the Handy & Harman Facility.

62. As part of the Remedial Investigation of the Site, surface and subsurface soil samples were collected from a sampling grid and shallow groundwater samples were collected from the monitoring well network at the Site (CH2M Hill, 1997a). The analytical results from these sampling activities conducted in 1993, indicated elevated concentrations of contaminants at three areas of concern (the "Hot Spots"). Benzene and TCE were identified as the principle contaminants of concern based on the highest concentrations. PCE, and 1,1,1-trichloroethane ("1,1,1-TCA") along with their biodegradation products, *cis*-1,2-dichloroethylene ("*cis*-1,2-DCE"), 1,2-dichloroethane ("1,2-DCA"), and vinyl chloride ("VC"), among others were reported as secondary contaminants of concern with elevated concentrations.

63. As stated in the Record of Decision for the Site (USEPA, 1998), "Extremely high levels of TCE and high levels of PCE and 1,1,1-TCA were detected in the soil following drum removal" at Hot Spot 1 located within the wetland area at the north end of the Site. Methyl isobutyl ketone ("MiBK") was also reported to have elevated concentrations in the soils at Hot Spot 1 (CH2M Hill, 1997a). Shallow groundwater monitoring wells in the area of Hot Spot 1 included monitoring wells MW-10, MW-17, and MW-23. Groundwater samples collected from these wells contained concentrations of contaminants of concern in excess of the Maximum Contaminant Levels ("MCLs") and Risk Based Concentrations ("RBCs") for the following compounds (CH2M Hill, 1997a):

- chromium;
- lead;

- nickel;
- thallium;
- MiBK;
- 1,1,1-TCA;
- 1,1,2-trichloroethylene ("1,1,2-TCA");
- 1,1-dichloroethylene ("1,1-DCE");
- 1,3-dichlorobenzene;
- 1,2-dichloroethane ("1,2-DCA");
- 1,2-dichloroethylene ("1,2-DCE");
- 1,2-dichloropropane ("1,2-DCP");
- benzene;
- *cis*-1,2-DCE;
- PCE;
- *trans*-1,2-dichloroethylene ("1,2-DCE");
- TCE; and
- VC.

64. Of the chemical compounds found in the soils and groundwater of Hot Spot 1 at concentrations in excess of the Drinking Water MCLs and RBCs, only chromium, nickel, and TCE would have been constituents in the wastes generated by the Handy & Harman Facility. As a group, the contaminants of concern in the soil and groundwater at Hot Spot 1 could not have come from the Handy & Harman waste.

65. In the Remedial Investigation, soil samples collected from the area south of the farmhouse (designated as Hot Spot 2) contained elevated concentrations of 1,1,1-TCA; MiBK; *cis*-1,2-DCE; ethylbenzene; xylenes; PCE; toluene; and TCE. Shallow groundwater monitoring wells in the area of Hot Spot 2 included monitoring wells MW-14, MW-16, MW-20, and MW-21. Groundwater samples collected from these wells contained concentrations of contaminants of concern in excess of the Drinking Water MCLs and RBCs for the following compounds (CH2M Hill, 1997a):

- beryllium,
- cadmium,
- chromium,
- lead,

- manganese,
- nickel,
- bhc-alpha,
- bhc-gamma,
- nitrobenzene,
- 1,1,1-TCA,
- 1,1,2-TCA,
- 1,1-DCE,
- 1,2-DCA
- MiBK,
- benzene,
- carbon tetrachloride,
- cis-1,2-DCE,
- ethylbenzene,
- methylene chloride,
- PCE,
- TCE, and
- VC

66. Of the chemical compounds found in the soils and groundwater of Hot Spot 2 at concentrations in excess of the Drinking Water MCLs and RBCs, only chromium, manganese, nickel, and TCE would have been constituents in the wastes generated by the Handy & Harman Facility. As a group, the contaminants of concern in the soil and groundwater at Hot Spot 2 could not have come from the Handy & Harman waste.

67. Similarly, for Hot Spot 3, the surface soil contamination identified for the area included MiBK, TCE, and xylenes as contaminants of concern for the impacted soils. Shallow groundwater monitoring wells in the area of Hot Spot 3 included monitoring wells MW-12, MW-13, and MW-15. Groundwater samples collected from these wells contained concentrations of contaminants of concern in excess of the Drinking Water MCLs and RBCs for the following metals (CH2M Hill, 1997a):

- antimony;
- cadmium;
- chromium;
- lead;

- manganese;
- nickel; and
- thallium.

68. Contaminants of concern including 1,2-DCA, 1,2-DCP, benzene, *cis*-1,2-DCE, and VC were detected at concentrations exceeding Drinking Water MCLs in groundwater samples from monitoring well MW-12 only, which was located near of the test pits where a large number of drums were removed.

69. Of the chemical compounds found in the soils and groundwater of Hot Spot 3 at concentrations in excess of the Drinking Water MCLs and RBCs, only chromium, manganese, and nickel would have been constituents in the wastes generated by the Handy & Harman Facility. As a group, the contaminants of concern in the soil and groundwater at Hot Spot 3 could not have come from the Handy & Harman waste.

70. As with the drum wastes, however, the chemical fingerprint of the contaminated soil and groundwater (CH2M Hill, 1997a) does not match the characteristics of the waste generated by the Handy & Harman Facility since the waste found at the Site contains hazardous substances (i.e., benzene, PCE, and MiBK, among others) that were not used at the Handy & Harman Facility and were not constituents of the waste generated by the Handy & Harman Facility. Therefore, the waste associated with the soil and groundwater contamination at the Hot Spots can not be attributed directly to Handy & Harman.

71. Furthermore, if the characteristic profile of the wastes generated by the Handy & Harman Facility is compared with the observed list of contaminants of concern at the Site, it would be impossible to distinguish the wastes generated by the Handy & Harman Facility from the mixture of different waste streams at the Site (See also Paragraph 75-77).

v. *Contributions from Other Parties*

72. I reserve the right to supplement this report upon receipt of the report from Joseph J. Hochreiter, Jr., CGWP, which addresses the Plaintiffs and Settled Defendants' manufacturing operations and waste streams.

73. Based on my review of information and data listed in Exhibit D, Carpenter Technology Corporation, Merit Metals, Flexible Circuits, Southland Corporation, Thomas and Betts, and Rahns Specialty Metals generated wastes containing hazardous substances including chlorinated volatile organic compounds and benzene, among others, and had relationships with DeRewal Chemical Company for transportation and/or disposal of wastes at the Site.

a. Carpenter Technology Corporation operated a manufacturing facility producing specialty steel products in Reading, Pennsylvania (DeRewal and Carpenter, 1973a). Waste streams associated with the manufacturing process at the Carpenter facility included spent acids, caustics, and heavy sludge that was disposed off-site (The Carpenter Report, 1965). In 1973, Carpenter entered into an agreement with DeRewal Chemical Company to "remove and suitably dispose of waste hydrochloric acid pickling solution from Carpenter's plant in Reading, Pennsylvania" with a minimum waste volume for disposal of 4,000 gallons (DeRewal and Carpenter, 1973a). In his deposition, Freddy DeRewal testified that he hauled between 30 and 40 tanker truck loads of waste from the Carpenter facility with some of the waste transported to the Site (DeRewal, F., 2003a, pg. 135).

- Q. Did they tell you what type of waste it was or where it was coming from?
- A. I don't remember. But I know it was hydrochloric.
- Q. What type of tank did you use to do that type of pick-up?
- A. It was a rubber-lined tanker.
- Q. What did they hold?
- A. 4,000 to 4,300 gallons.